



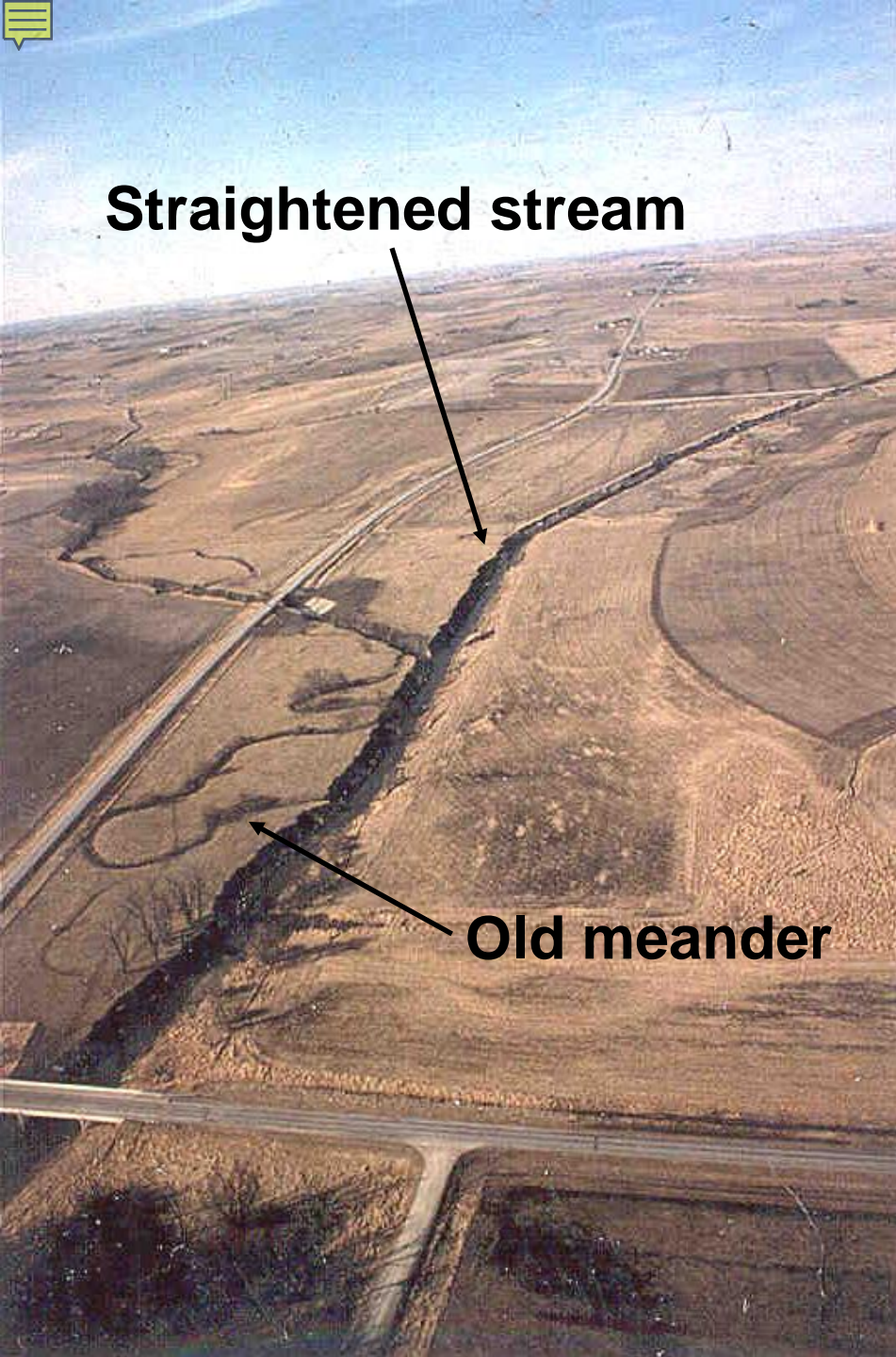
Hungry Canyons Alliance:

Stream Stabilization in Western Iowa



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Engineer

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HCA Project
Director



Causes of Streambed Degradation

Highly erodible loess soils
+
Stream straightening and
land use changes
=
Higher water velocities
=
Channel downcutting
=
Accelerated stream
channel erosion



Streambed Degradation - Knickpoints



Page County knickpoint: Formed during May 2007 floods; Migrated 314 feet upstream by December 2007; ~5,000 tons of sediment eroded



May



June



August



December



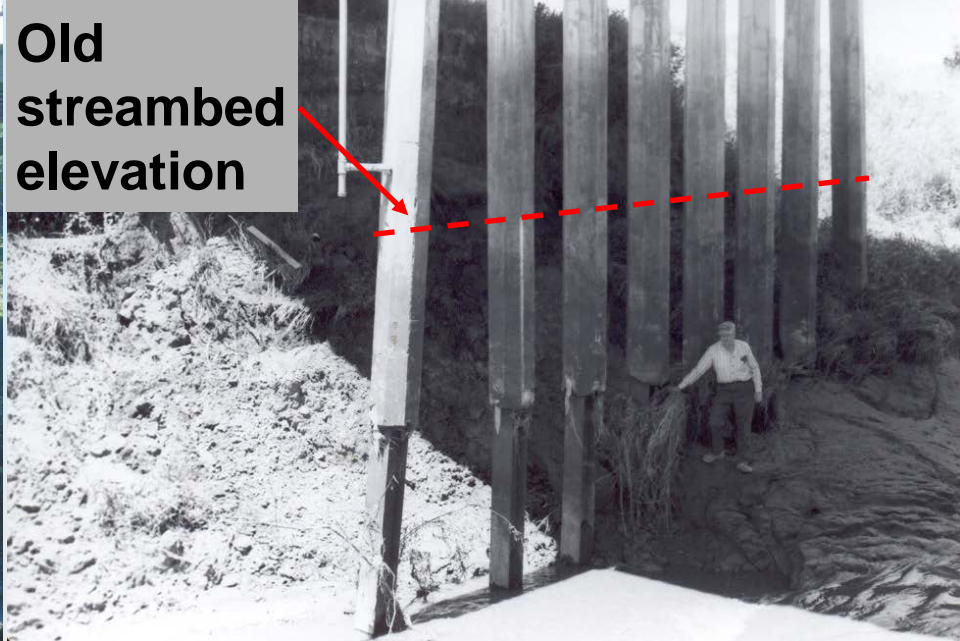
Streambed Degradation – Headcuts, Bank Failure, and Stream Widening





Gully Growth Rates: 1 Year - Cass County; 5 Years – Fremont County





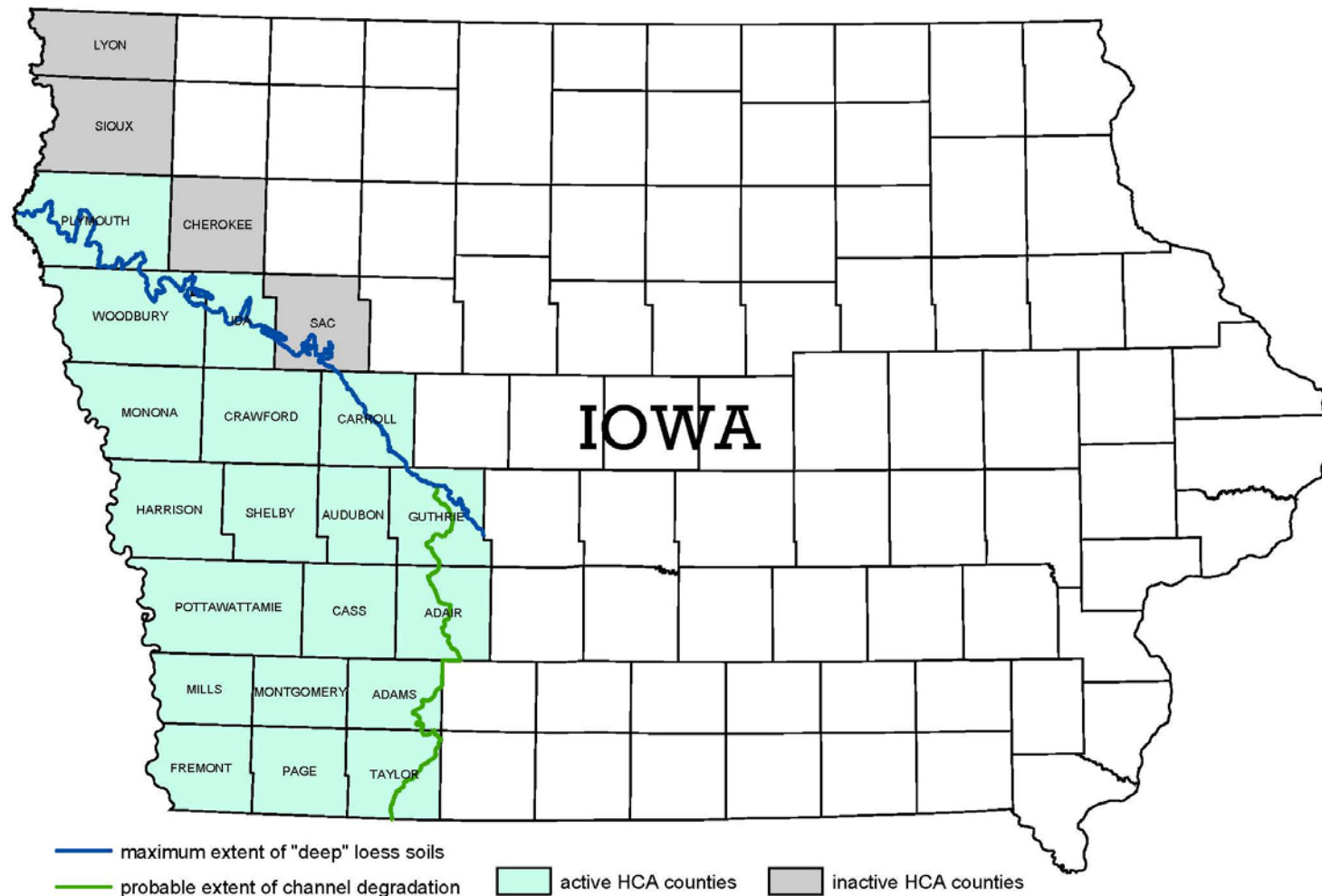
Old
streambed
elevation

Bridge damage due to streambed degradation

Approximate old channel cross section



Counties in the Hungry Canyons Alliance



The HCA's purpose is to focus attention on the problems of, and develop solutions related to, stream channel degradation in 23 counties of western Iowa with deep loess soils

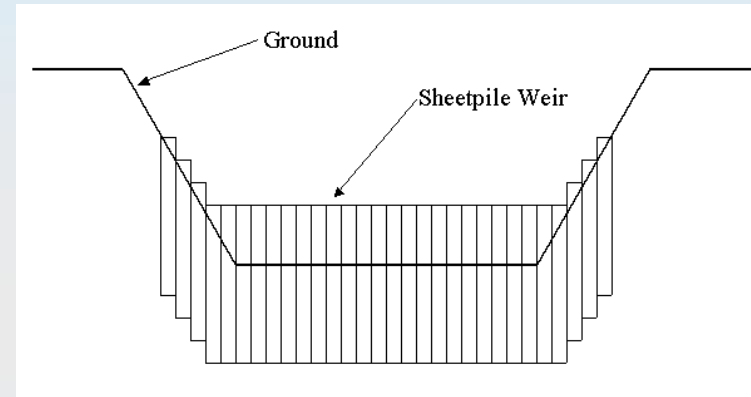
HCA Streambed Stabilization and Watershed Awareness

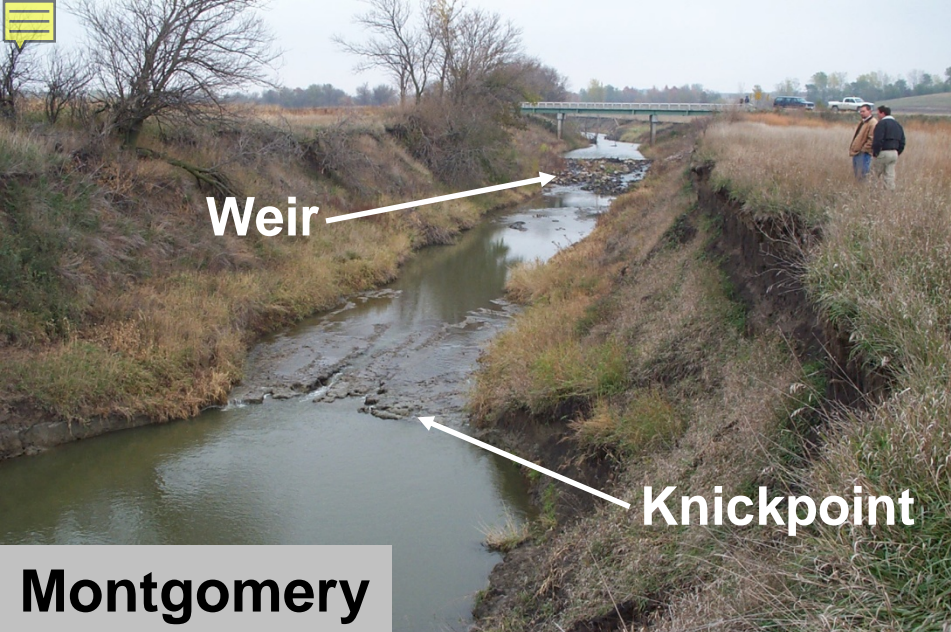


- Streambed stabilization key to preventing erosion & protecting infrastructure
- Knickpoints affect entire watershed as erode upstream
- Structures planned on watershed scale
- Stream videos locate erosion
- Structures at regular intervals change stream profile from erosive steep incline to stable stair-step pattern
- Site locations planned across political boundaries

Grade Control Structures

- Raised steel sheet pile weir
- Rip-rap, concrete grout slopes
- Decreases slope of streambed
- Prevents further downcutting
- Creates an upstream backwater condition
 - Sediment settles out upstream
 - Reduces sediment loads
 - Protects bridge pilings





HCA Grade Control Structures - 340 Total



 **Crawford**



Shelby



HCA Grade Control Structures - 340 Total



Monona



Harrison



Montgomery



Adair

HCA Grade Control Structures - 340 Total



Cass



Woodbury



Page



Page

Fish passage weirs



Montgomery



Audubon



Fremont



Crawford

Other Types of Grade Control Structures



Plymouth



Pottawattamie



Northern Natural Gas Pipeline & Structure Protection Project - Before HCA Involvement





Northern Natural Gas Pipeline & Structure Protection Project -After HCA Involvement

6



4



5

Known Streambed Grade Control Structures in Western Iowa and Construction Funding Sources:

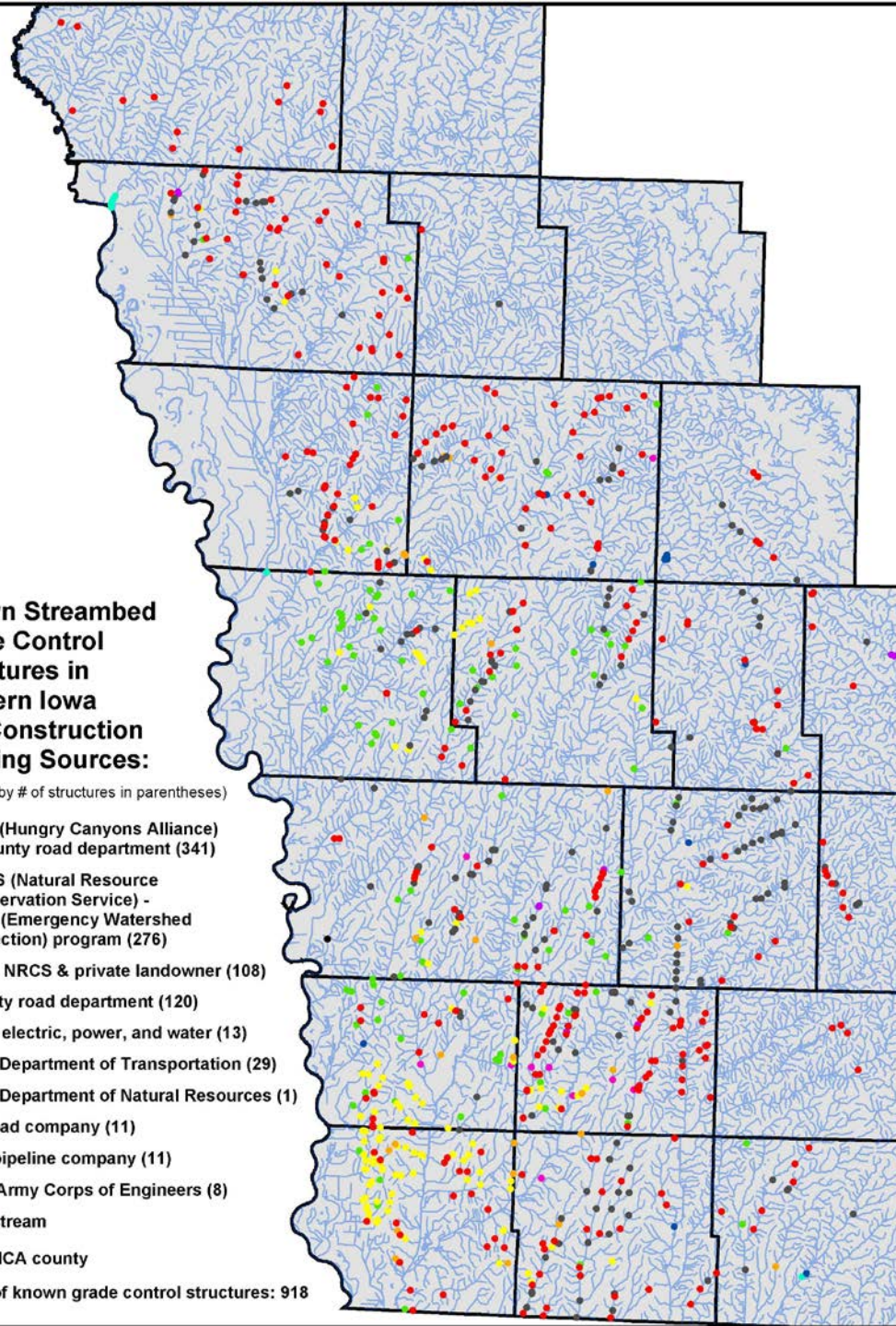
(followed by # of structures in parentheses)

- HCA (Hungry Canyons Alliance)
& county road department (341)
- NRCS (Natural Resource
Conservation Service) -
EWP (Emergency Watershed
Protection) program (276)
- HCA, NRCS & private landowner (108)
- county road department (120)
- city - electric, power, and water (13)
- Iowa Department of Transportation (29)
- Iowa Department of Natural Resources (1)
- railroad company (11)
- gas pipeline company (11)
- U.S. Army Corps of Engineers (8)

~ stream

■ HCA county

Total # of known grade control structures: 918





Floods of 2007-2008 and EWP Repairs



Floods of 2007-2008

- Severe rains in 2007 and 2008 (May 2007, June 2008)
 - widespread flooding and stream channel damage
 - worst flooding to hit western Iowa since 1993
- Grade control structures (GCS) directly reduced flood damage costs
 - No damage to infrastructure protected by GCS
 - Vast majority of GCS were undamaged
 - Any damages to GCS minimal compared to potential total loss of infrastructure without GCS
 - Witnessed by:
 - Federal Emergency Management Agency (FEMA)
 - Natural Resources Conservation Service (NRCS)
 - Hungry Canyons Alliance (HCA) and county road departments
 - Fewer claims to FEMA and NRCS-EWP Program



HCA and NRCS Emergency Watershed Protection (EWP) Program

- 25% local match requirement for NRCS-EWP projects
- Local county governments had budget deficits
- HCA state cost share (at 10%) and county funds (at 15%) to leverage millions of dollars of federal EWP funding (at 75%)
 - \$13.22 million total
 - Federal NRCS-EWP = \$9.92 million
 - HCA = \$1.32 million
 - sponsor counties = \$1.98 million
- 71 western Iowa flood repair GCS projects
- Construction completed December 2010
- Job creation for extra construction projects, materials, & heavy equipment at perfect time (approximately 44 jobs)



Benefits of Hungry Canyons Alliance Grade Control Structures

- Since 1992, 360 bridges/culverts protected
- Protection of numerous utility lines (electric, phone, gas, sewer, water)
- Protection of farmland
- Reduced sediment loads and improved water quality (21.6 million tons of sediment protected)



Benefits of Hungry Canyons Alliance Grade Control Structures

- Prevention of soil movement into Missouri River
- Reduction of the “dead zone” in Gulf of Mexico
- **For every \$1 invested in Hungry Canyons Alliance structures, more than \$4.20 in property value and 0.99 tons of soil is protected.**



Costly Problem



Affordable Solution



Thank You

Any Questions?



Contact Information

- For questions or comments about the information presented in this presentation, contact John Thomas, Hungry Canyons Alliance Project Director
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 - <http://goldenhillsrcd.org/hungrycanyons/index1.html>

Funding and Organization of HCA

- Annual State and Federal funding
- HCA and Counties pay GCS project costs (80% - 20%)
- One employee – very low administration costs – more funds for research and projects
- Housed in NRCS RC&D office – access to federal vehicle, supplies, equipment, etc.
- Board of Directors – county supervisors, county engineers, soil and water conservation district commissioners, etc., from member counties
- Scoring Committee reviews applications for cost share
- Four quarterly meetings / two tours annually